

September 24, 1999
Ref. No.: EOS/ETS-092499-C03

National Aeronautics and
Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Attention: Mr. Willie Fuller
Code 581
Building 32, Room S212D

Subject: Contract No.: NAS9-98100
CSOC SODA Task Order Number G936
EOSDIS Test System (ETS) Multimode Portable Simulator for PM-1
(MPS/PM-1) Delivery of the Release 2.0 Software

Dear Mr. Fuller:

We are pleased to deliver Release 2.0 of the ETS Multimode Portable Simulator for PM-1 (MPS/PM-1). This is the second delivery using our new Scalable, Integrated Multimission Simulation Suite (SIMSS) infrastructure and architecture with EOS PM-1 extensions, which we refer to as SIMSS/PM-1 throughout this delivery package.

As per NASA direction, the hardware for the second SIMSS/PM-1 unit has been installed in Building 32, Room S9. Attachment J contains the hardware description for this system. ETS personnel have provided several training sessions for the FOT and other users at GSFC.

The requirement to transmit the CLCW via EDUs has been implemented in this release. The format of the transmitted CLCW EDU, however, was changed by the project just prior to this delivery. The new format of the CLCW EDU will be implemented in the next release. A draft copy of the SIMSS/PM-1 User's Guide for Release 2 will be available to users shortly, and an updated copy will be delivered to you.

This delivery package contains 12 attachments as listed below. A completed Mission Systems Configuration Management (MSCM) form is included in Attachment L. If you have any questions concerning this delivery, please call me at 301-805-3653.

Page Two

EOSDIS Test System (ETS) Multimode Portable Simulator for PM-1 (MPS/PM-1)
Delivery of the Release 2.0 Software
September 24, 1999 Ref. No.: EOS/ETS-092499-C03

Sincerely yours,

Estelle S. Noone
CSOC ETS Task Leader

Delivery Package Reviewed and Approved by:

Janice Swope
CSOC ETS Customer Service Representative

The following attachments contain the details of the MPS software.

Attachment A - describes the delivery contents for this release
Attachment B - describes the operational changes
Attachment C - contains the instructions to build and install the software
Attachment D - contains any special operating instructions
Attachment E - contains a list of the resolved DRs
Attachment F - contains a list of the unresolved DRs
Attachment G - contains the matrix of requirements addressed by this release
Attachment H - contains the known system limitations
Attachment I - contains the release history summary matrix
Attachment J - contains a listing of the delivery media contents
Attachment K - contains documentation references
Attachment L - contains the Mission Systems Configuration Management (MSCM)
form

Distribution: (* - Letter Only)

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Task File

Attachment A – Description of Delivery Contents

The SIMSS/PM1 Release 2.0 consists of custom software executables that are being delivered on one CD-ROM. Two copies are being provided.

A soft copy of this MPS /PM1 Release 2.0 delivery letter and set of attachments is being delivered. The attachments have been formatted on a 3.5" IBM PC diskette utilizing the MS WORD word processing tool.

Attachment B – Summary of Operational Changes

B.1 Operational Capabilities of SIMSS/PM-1 Release 2.0

(New capabilities with this release are noted in *Italics*.)

Telemetry:

- Generate two streams of telemetry formatted as EDUs
- Start or stop one or both telemetry streams
- Display EDU data
- Reset packet count for one or both telemetry streams
- Packet data will be static (incrementing byte counts)
- Static packet data can be overwritten (by byte location)
- A subset of APIDs generated (based on list supplied by Raytheon)
- Incrementing packet sequence counters per APID
- Generation of individual APIDs can be inhibited
- Telemetry logs will be created (viewable by offline Hexedit program)
- Packet Headers and Packet Data are updated
- Packet data can be shown in hexadecimal or octal format and addressed in hexadecimal or decimal form
- Packet Sequence Counters can be reset
- Packet Sequence Counters can be modified
- Packet Version field can be modified
- Packet Type field can be modified
- Packet SH Flag field can be modified
- Packet Length field can be modified
- CUC can be modified
- Packet rate may be controlled
- *CLCW transmitted via EDUs*
- *IP packets are transmitted with variable lengths*
- *CLCW can be overridden by the operator*
- *Transmission of CLCW can be inhibited*

Command:

- Ingest type AD, BC, and BD commands
- Display Total CLTUs count
- Reset Total CLTUs count
- Display Rejected CLTUs count
- Reset Rejected CLTUs count
- Display Instrument commands count
- Reset Instrument commands count
- Display Spacecraft commands count
- Reset Spacecraft commands count
- Display BC commands count

- Reset BC commands count
- Display BD commands count
- Display current Spacecraft CLCW
- Update current CLCW
- Display current Instrument CLCW
- Validate commands based on individual, all, or none of the following validation criteria: CLTU Start and Tail Sequences, BCH Error Code, Transfer Frame Header Fields, FARM (Valid Frame Sequence), User Command Packet Header
- Generate event messages based on ingest
- Log raw commands (viewable by offline Hexedit program)
- Display raw command in hexadecimal or octal format addressed in either hexadecimal or decimal fashion
- *Display command packet headers for instrument commands*
- *Display command packet headers for spacecraft commands*

Time:

- Maintain and update SC time (GIRD)
- Maintain and update GMT time
- Synchronize SC and GMT times

Attachment C – Release 2.0 Installation Instructions

Instructions for Installation of NeTT Server and NeTT Client

1. Insert delivery media into appropriate drive.
2. Go to the files on the installation media:
 - a) On the desktop, click on the Start button, and then select Run from resulting menu.
 - b) When the Run window appears select the Browse... button.
 - c) From the Browse Window, select the Removable drive that contains the installation disk
 - d) Three folders are then shown for the installation media: client, server and jdk.
3. To install the NeTT Client:
 - a) Click on the Client folder.
 - b) From within the Client folder, double click on the Setup icon.
 - c) The screen will be filled with a NeTT Client background and a smaller window with the title “Welcome to NeTT Client 2.0” will appear. Click on the Next button to proceed to the next step.
 - d) The next window will contain the licensing agreement. Click on Yes to accept the agreement and proceed.
 - e) After all of the files are copied, a window with the title “Setup Complete” will appear. Click on the Finish button to end.
 - f) A NeTT Client icon should now be installed on the desktop.
4. To install the NeTT Server:
 - a) Click on the Server folder.
 - b) From within the Server folder, double click on the Setup icon
 - c) A window with the title “Run Window” will appear. Click on the Okay button to proceed to the next step.
 - d) The screen will then be filled with a NeTT Server background and a window with the title of “Welcome to NeTT Server 2.0” will appear. Click the Next button to proceed.
 - e) A window with the title “Choose Destination” will appear. Click on the Next button to proceed.
 - f) Then a window with the title “Select Program Folder” will appear. Click on the Next button.
 - g) A window with the title “Start Copying Files” will appear. Click on the Next button to proceed.
 - h) Next a window will show the completion status as the files are copied. When the copying is complete click on the Next button to finish the installation.
 - i) A NeTT Server icon will be installed on the desktop.

Attachment D – Special Operating Instructions

There are no special operating instructions for SIMSS/PM-1 Release 2.0. Standard operating procedures are included in the User's Guide for SIMSS/PM-1. The User's Guide will be available from the ETS home page at <http://esdis-it.gsfc.nasa.gov/ETS/ets.html> .

Attachment E – Resolved Discrepancy Reports

The following Discrepancy Reports (DRs) have been closed by and are being delivered with SIMSS/PM-1 Release 2.0. The DRs are listed in the table below, which provides the DR Number, Status, Severity, Subsystem Name, and a short description. A full description of each DR follows the summary table. Complete information on all DRs may be accessed via the Internet at address <http://iree.gsfc.nasa.gov/dtts/> (directly) or from the ESDIS Integration and Test home page at <http://esdis.gsfc.nasa.gov/integ/integ.html>.

Summary of Closed Discrepancy Reports

Critical(1)	Urgent(2)	Routine(3)	Total
0	3	0	3

Status Definitions

N – New

V - Assigned Verification

W – Withdrawn

A - Assigned Analysis

T – Tested

P – Postponed

R - Analysis Entered

C – Closed

X – Duplicate

DDTS ID	DR #	Status	Sev	Subsystem	Description	Related NCR
SMOdr05250	ETS0322	C	2	MPS-PM	Transmit IP packets are fixed length	
SMOdr05389	ETS0323	C	2	MPS-PM	Data transmit rate of zero causes abnormal termination	
SMOdr05390	ETS0324	C	2	MPS-PM	Invalid IP address or port setting causes abnormal termination	

DR: SMOdr05250 (ETS0322)

Related NCR:

Submitted: 990817

Status: CLOSE

Subsystem: MPS-PM

Closed: 990924

Title: Transmit IP packets are fixed length

***** Problem (for SMOdr05250) *****

The IP transmit packets are fixed length at 276 bytes/packet. Need to have variable length IP transmission. Packets need to be size of telemetry pkt plus EDOS Service Header.
Reported by Kevin Klem of Raytheon at Denver, CO

***** Modules/Units Changed (for SMOdr05250) *****

IP Client:

NeTTIPInputModuleConfig.java, IPInputMessageDefinitions.java,
NeTTIPOutputModuleConfig.java,
IPOutputMessageDefinitions.java

Logger Client:

NeTTLogModuleMVC.java
NeTTLogModuleConfig.java
LogMessageDefinitions.java

PM-1 Simulator Server

TlmSend.cpp

IP Server

IPDllMain.cpp, DllModuleClass.h, DllModuleClass.cpp,
NeTTIPModuleThread.h, NeTTIPModuleThread.cpp,
NeTTIPPacketHandler.h, NeTTIPPacketHandler.cpp

Logger Server:

NeTTIO.h, NeTTIO.cpp,
NeTTLogModuleThread.h, NeTTLogModuleThread.cpp

DR: SMOdr05389 (ETS0323)

Related NCR:

Submitted: 990916

Status: CLOSE

Subsystem: MPS-PM

Closed: 990924

Title: Data transmit rate of zero causes abnormal termination

***** Problem (for SMOdr05389) *****

Called up the Control Packet display from the Telemetry menu.
Set the APID field to any legal APID and clicked on Enable.
Left the data rate at zero.
Clicked on Apply and the system locked up.
Can eventually (after some minutes) get control via the Task Manager and abort the program.

DR: SMODr05390 (ETS0324)

Related NCR:

Submitted: 990916

Status:CLOSE

Subsystem: MPS-PM

Closed: 990924

Title: Invalid IP address or port setting causes abnormal termination

***** Problem (for SMODr05390) *****

When configuring the simulator for operation, left input and output IP modules set to defaults. Server crashed on startup.

Attachment F – Unresolved Discrepancy Reports

SIMSS/PM-1 Release 2.0 test verification generated one new Internal Discrepancy Report (IDR), which has been converted to a Discrepancy Report (DR). The new DR is being entered into the ESDIS Discrepancy Report Tracking Tool (DRTT). All open ETS MPS-PM DRs are listed in the following table. The table includes the DR Number, Status, Severity, Subsystem Name, and a short description. Additionally, one DR that failed Release 2.0 test verification is also listed (marked with an asterisk). A full description of each DR follows the summary table. Complete information on all DRs may be accessed via the Internet at address <http://iree.gsfc.nasa.gov/dtts/> (directly) or from the ESDIS Integration and Test home page at <http://esdis.gsfc.nasa.gov/integ/integ.html>.

Summary of Open Discrepancy Reports

Critical(1)	Urgent(2)	Routine(3)	Total
0	2	0	2

Status Definitions

N – New

V - Assigned Verification

W – Withdrawn

A - Assigned Analysis

T – Tested

P – Postponed

R - Analysis Entered

C – Closed

X – Duplicate

DDTS ID	DR #	Status	Sev	Subsystem	Description	Related NCR
SMOdr05453	ETS0330	N	2	MPS-PM	Cannot restore saved projects	
*SMOdr05391	ETS0325	A	2	MPS-PM	Extended period of operation occasionally causes abnormal termination	

DR: SMODr05453 (ETS0330)

Related NCR:

Submitted: 990924

Status: NEW

Subsystem: MPS-PM

Title: Cannot restore saved projects

***** Problem (for SMODr05453) *****

During initialization attempts to restore saved projects usually cause the server to crash.

DR: *SMODr05391 (ETS0325)

Related NCR:

Submitted: 990916

Status:TEST-FAIL

Subsystem: MPS-PM

Tested: 990924

Title: Extended period of operation occasionally causes abnormal termination

***** Problem (for SMODr05391) *****

When left running for an extended period of time, the system will eventually terminate abnormally.

Attachment G – Requirements Matrix
(Compliance changes from Release 1.0 are in bold)

Requirement Specification	Requirement Description	Compliance (Full/Partial/None)	Comment
	The SIMSS/PM-1 GUI and simulator shall be year 2000 compliant.	F	
PMCMD-01	SIMSS/PM-1 shall be capable of selecting a desired version of the PDB at operator request during initialization.	N	
PMCMD-01.1	An operator shall place all current versions of the PDB files in a predefined location in the file system and shall remove all outdated versions of the PDB files from that location.	N	
PMCMD-02	SIMSS/PM-1 shall execute directives that start and stop logging of commands.	F	Log modules do not allow a user to stop and restart logging to the same file. Each start requires a new log file name or the previously logged data will be lost. The Log module should be enhanced to allow appending to an existing file.
PMCMD-03	SIMSS/PM-1 shall execute commands that enable or disable any element of the command validation process.	F	
PMCMD-03.1	The command subsystem shall query an external interface to determine which elements of command validation are enabled.	F	
PMCMD-03.2	The command subsystem shall validate the command elements if validation is enabled. The command validation elements are CLTU start and tail sequence validation, Codeblock BCH Parity validation, Transfer frame header validation, FARM Protocol validation and User command Packet header validation.	F	This requirement should be modified to remove the CLTU validation element.
PMCMD-03.3	When the CLTU Start and Tail sequences validation element is enabled, the command subsystem will verify that the CLTU's 16 bit start and 64 bit tail sequences match the values defined in the ICD. When this element is disabled, the start and tail sequences are ignored. If this CLTU validation fails, an event message will be generated and the entire CLTU will be discarded.	P	This requirement should be modified or deleted. A design change made it necessary to parse the input for CLTUs instead of assuming that the item received was a single CLTU. This validation of CLTU start and tail sequences can no longer be disabled.
PMCMD-03.4	When the codeblock BCH parity validation element is enabled, the command subsystem will verify that the BCH parity byte matches a computed value and that the spare bit is equal to zero. When this element is disabled, the parity byte is assumed to be valid. If any codeblock of a CLTU fails validation, an event message will be generated and the entire CLTU will be discarded. The BCH parity calculation is the same as for the EOS AM-1 spacecraft.	F	

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(Compliance changes from Release 1.0 are in bold)

PMCMD-03.5	When the Transfer Frame Header validation element is enabled, the command subsystem will verify that all of the fields of the Transfer Frame Header except the sequence number match expected values and ranges as defined in the ICD. When this element is disabled, the Transfer Frame Header values are assumed to be valid. If the Transfer Frame Header validation fails, an event message will be generated and the entire Transfer Frame will be discarded. If applicable, the CLCW for the Transfer Frame's virtual channel will also be updated with error information.	F	
PMCMD-03.6	When the FARM validation element is enabled, the command subsystem will verify that the Transfer Frame sequence number is valid as expected for FARM-1 protocol as defined in the ICD. When this element is disabled, the Transfer Frame sequence number is assumed to be valid. If the FARM validation fails, an event message will be generated, the appropriate CLCW will be updated and the entire Transfer Frame will be discarded.	F	
PMCMD-03.7	When the Command Packet Header validation element is enabled, the command subsystem will verify that the Command Packet Header fields are as defined in the ICD. When this element is disabled, the Command Packet Header is assumed to be valid. If the Command Packet Header validation fails, an event message will be generated and the Command Packet will be discarded. Currently there is a spacecraft telecommand packet format and an instrument command packet format.	F	
PMCMD-04	SIMSS/PM-1 shall execute command directives that override the CLCW.	F	
PMCMD-05	SIMSS/PM-1 shall provide the capability to respond to that subset of spacecraft commands that are defined in the PM-1 PDB End item verifiers file.	N	
PMCMD-05.1	The command subsystem shall match a received command bit pattern to a command mnemonic in the PDB. Based on the command mnemonic, and end-item verifier telemetry mnemonic and value will be found in PDB information. If an end-item verifier telemetry mnemonic is found, it will be set to the PDB defined value.	N	
PMCMD-06	SIMSS/PM-1 shall simulate spacecraft command acceptance according to the COP-1 protocol.	F	
PMCMD-06.1	SIMSS/PM-1 shall perform type AD spacecraft acceptance checks in accordance with the FARM-1 protocol if FARM-1 protocol checking is enabled.	F	

Attachment G – Requirements Matrix
(Compliance changes from Release 1.0 are in bold)

PMCMD-06.1.1	SIMSS/PM-1 shall reject type AD spacecraft commands and post a command rejected event message if the lockout bit is set in the spacecraft CLCW.	F	
PMCMD-06.01.2	SIMSS/PM-1 shall reject type AD spacecraft commands, post a command rejected message, and set the lockout bit in the spacecraft CLCW if (1)the frame sequence count in the transfer frame header is more than 90 counts greater than or more than 90 counts less than(modulo 256)the Report Value field of the spacecraft CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.	F	
PMCMD-06.01.3	SIMSS/PM-1 shall reject type AD spacecraft commands, post a command rejected message, and set the Retransmit bit in the spacecraft CLCW if(1)the frame sequence count in the transfer frame header is between one and 89 counts greater than(modulo 256)the contents of the Report Value field of the spacecraft CLCW <u>and</u> (2)FARM-1 protocol checking is enabled.	F	
PMCMD-06.01.4	SIMSS/PM-1 shall reject type AD spacecraft commands and post a command rejected message if (1) the Frame Sequence count in the transfer frame header is between one and 90 counts less than (modulo 256) the contents of the Report Value field of the spacecraft CLCW and (2) FARM-1 protocol checking is enabled.	F	
PMCMD-06.01.5	SIMSS/PM-1 shall clear the spacecraft CLCW Lockout bit upon receipt of an UNLOCK Control Command (Type BC) containing the spacecraft VCID.	F	
PMCMD-06.01.6	SIMSS/PM-1 shall set the spacecraft CLCW Report Value field to the data value contained within the third byte of a SET V(R) Control Command (Type BC) containing the spacecraft VCID.	F	
PMCMD-06.01.7	SIMSS/PM-1 shall increment the Report Value field (modulo 256) of the spacecraft CLCW upon receipt of a type AD spacecraft command whose Frame Sequence Count matches the current spacecraft CLCW Report Value field contents, providing that FARM-1 protocol checking is enabled.	F	
PMCMD-06.02	SIMSS/PM-1 shall perform type AD instrument command acceptance checks in accordance with the FARM-1 protocol if FARM-1 protocol checking is enabled.	F	
PMCMD-06.02.1	SIMSS/PM-1 shall reject type AD instrument commands and post a command rejected event message if the Lockout bit is set in the instrument CLCW.	F	

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PMCMD-06.02.2	SIMSS/PM-1 shall reject type AD instrument commands, post a command rejected message, and set the Lockout bit in the instrument CLCW if (1) the Frame Sequence count in the transfer frame header is more than 90 counts greater than or more than 90 counts less than (modulo 256) the Report Value field of the instrument CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.	F	
PMCMD-06.02.3	SIMSS/PM-1 shall reject type AD instrument commands, post a command rejected message, and set the Retransmit bit in the instrument CLCW, if (1) the Frame Sequence count in the Transfer Frame header is between one and 90 counts greater than modulo 256) the report Value field of the instrument CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.	F	
PMCMD-06.02.4	SIMSS/PM-1 shall reject type AD instrument commands, post a command rejected message if (1) the Frame Sequence count in the Transfer Frame header is between one and 89 counts greater than (modulo 256) the report Value field of the instrument CLCW <u>and</u> (2) FARM-1 protocol checking is enabled.	F	
PMCMD-06.02.5	SIMSS/PM-1 shall clear the instrument CLCW Lockout bit upon receipt of an UNLOCK Control command (type BC) containing the instrument VCID.	F	
PMCMD-06.02.6	SIMSS/PM-1 shall set the instrument CLCW Report Value field to the data value contained within the third byte of a SET V(R) Control Command (type BC) containing the instrument VCID.	F	
PMCMD-06.02.7	SIMSS/PM-1 shall increment the Report Value field (modulo 256) of the instrument CLCW upon receipt of a type AD instrument command whose Frame Sequence count matched the current instrument CLCW Report Value field contents, providing that FARM-1 protocol checking is enabled.	F	
PMCMD-07	SIMSS/PM-1 shall provide the capability to read and interpret flags in spacecraft command headers.	P	The flags in the Transfer Frame and Primary Packet headers are read and interpreted. Additional headers may need to be interpreted in order to identify commands. This requirement will be refined.
PMCMD-08	SIMSS/PM-1 shall provide the capability to validate all headers of received data.	P	This requirement will be refined.
PMCMD-09	SIMSS/PM-1 shall provide the capability to monitor and display command processing status.	F	
PMCMD-10	SIMSS/PM-1 shall store received commands for posttest review subject to specified storage capacities.	F	

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PMCMD-11	SIMSS/PM-1 shall simulate spacecraft command validation processing using information from the PDB.	N	
PMCMD-12	SIMSS/PM-1 shall generate a simulator event message whenever a valid command is received.	P	The PDB must be supplied to complete implementation.
PMCMD-13	SIMSS/PM-1 shall generate a simulator event message whenever a command error is detected.	P	The PDB must be supplied to complete implementation.
PMCMD-14	SIMSS/PM-1 shall provide the capability to verify the received EOS spacecraft commands by updating the two command link control words (CLCW).	F	
PMCMD-15	SIMSS/PM-1 shall execute directives that configure command processing for IP mode.	F	
PMCMD-16	SIMSS/PM-1 shall execute directives that set the expected values within the Command Data Block (CDB) header.	N	
PMCMD-17	SIMSS/PM-1 shall be capable of receiving command data as UDP command blocks.	F	
PMCMD-18	SIMSS/PM-1 shall be capable of receiving command data blocks.	F	
PMCMD-19	SIMSS/PM-1 shall receive spacecraft and memory loads and shall store the load data in the simulated memory.	N	
PMCMD-20	SIMSS/PM-1 shall perform a CRC validation in the load data and shall set a pass/fail indicator in telemetry.	N	
PMCMD-21	SIMSS/PM-1 shall process commands that request or configure for a Spacecraft Controller Computer memory dump.	N	
PMCMD-22	SIMSS/PM-1 interface with the EOC shall comply with the command interface formats and protocols specified in the EDOS to EGS Elements Interface document.	P	The simulator does not fill in all fields of all headers. Some formats are still being redefined by the project.
PMCMD-23	SIMSS/PM-1 shall update multiple command counters.	N	
PMCMD-24	SIMSS/PM-1 shall interpret both VCID 0 and VCID 1 commands.	P	Transfer Frame headers and Packet headers are recognized for both virtual channels.
PMCMD-25	SIMSS/PM-1 shall interpret multipart commands.	N	
PMGUI-01	The SIMSS/PM-1 GUI shall accept and validate all operator directives.	P	All defined directives have been implemented.
PMGUI-02	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands that set spacecraft time and GMT.	F	
PMGUI-03	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands that configure command processing for IP mode.	F	
PMGUI-04	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands that enable or disable any element of command validation.	F	

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PMGUI-05	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands that set the CLCW.	F	
PMGUI-06	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands that configure telemetry processing for IP mode.	F	
PMGUI-07	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands that set packet intervals for all real-time telemetry.	F	
PMGUI-08	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands to start and stop telemetry transmission.	F	
PMGUI-09	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands that set values of telemetry parameters (based on mnemonic).	N	
PMGUI-10	The SIMSS/PM-1 GUI shall accept directives that result in erroneous telemetry header values	F	
PMGUI-11	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands to turn on and off selected orbit modeling.	N	Modeling requirement TBD
PMGUI-12	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands to change between static, table or algorithm models.	N	Modeling requirement TBD
PMGUI-13	Creation of simulation timelines (scenario files) shall be performed offline via a text editor.	N	
PMGUI-14	Execution of a simulation timeline results in TBD directives being sent to the SIMSS/PM-1 simulator.	N	
PMGUI-15	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands to start and stop logging of commands.	F	
PMGUI-16	The SIMSS/PM-1 GUI shall build and forward display requests for all EDOS telemetry status displays.	F	
PMGUI-17	The SIMSS/PM-1 GUI shall provide at least one status display to the operator, showing key information about the configuration of the simulator.	F	
PMGUI-18	The SIMSS/PM-1 GUI shall provide the capability to display command packets received to the operator.	F	
PMGUI-19	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands to start and stop logging of telemetry.	F	
PMGUI-20	The SIMSS/PM-1 GUI shall provide the capability to display telemetry packets and EDUs transmitted, to the operator.	F	
PMGUI-21	The SIMSS/PM-1 GUI shall update the telemetry and command status for display periodically, as required.	F	
PMGUI-22	The SIMSS/PM-1 GUI shall provide the capability to display the current network and multicast configuration to the operator.	F	

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(Compliance changes from Release 1.0 are in bold)

PMGUI-23	SIMSS/PM-1 shall execute directives that set spacecraft time and GMT.	F	
PMGUI-24	The SIMSS/PM-1 GUI shall build and forward simulation configuration commands to set the IP address and port numbers.	F	
PMGUI-25	SIMSS/PM-1 shall display GMT and spacecraft times.	F	
PMGUI-26	SIMSS/PM-1 shall display EDOS Service Header.	N	
PMGUI-27	SIMSS/PM-1 shall display Telemetry packet header.	F	
PMGUI-28	SIMSS/PM-1 shall display event messages.	F	
PMGUI-29	SIMSS/PM-1 shall display CLCW.	F	
PMGUI-30	SIMSS/PM-1 shall display mnemonic of command received.	N	
PMGUI-31	SIMSS/PM-1 shall display TLM status.	F	
PMGUI-32	SIMSS/PM-1 shall display command status.	F	
PMTLM-01	SIMSS/PM-1 shall execute directives that start and stop logging of telemetry.	F	
PMTLM-02	SIMSS/PM-1 shall execute directives that configure the transmission of telemetry.	N	
PMTLM-03	SIMSS/PM-1 shall execute directives that set packet generation rates for all real-time APIDs generated by the PM-1 spacecraft.	P	PDB must be supplied for full implementation of this requirement.
PMTLM-04	SIMSS/PM-1 shall execute directives that set the value of any telemetry parameter by mnemonic.	N	
PMTLM-05	SIMSS/PM-1 shall execute directives that set the value of any location in the PM-1 simulated spacecraft memory.	N	
PMTLM-06	SIMSS/PM-1 shall execute directives that request the value of any telemetry parameter for display in raw data.	N	
PMTLM-07	SIMSS/PM-1 shall execute console directives that request the contents of any telemetry packet	N	
PMTLM-08	SIMSS/PM-1 shall execute telemetry directives that request the value of any location or block of locations in spacecraft memory.	N	
PMTLM-09	SIMSS/PM-1 shall set initial telemetry parameter values from information extracted from the PDB and user provided files.	N	
PMTLM-10	SIMSS/PM-1 shall execute telemetry directives that control the PM-1 Solid State Recorder pointers.	N	
PMTLM-11	SIMSS/PM-1 shall provide the capability to insert simulated time codes in telemetry packet headers.	F	
PMTLM-12	SIMSS/PM-1 shall provide for the storage of telemetry to be used as playback data.	N	

Attachment G – Requirements Matrix
(Compliance changes from Release 1.0 are in bold)

PMTLM-13	SIMSS/PM-1 shall provide the capability to generate and transmit telemetry using APIDS identical to the PM-1 spacecraft.	P	PDB must be supplied for full implementation of this requirement.
PMTLM-14	SIMSS/PM-1 shall format telemetry parameters into packets as specified in the PM-1 PDB packet definitions for S-band telemetry.	N	
PMTLM-15	SIMSS/PM-1 shall provide the capability to insert fill data into generated test data.	N	
PMTLM-16	SIMSS/PM-1 shall send out telemetry packets at specified intervals of spacecraft time. These intervals shall be as defined for each APID by the PDB and shall be modifiable by the operator.	P	PDB must be supplied for full implementation of this requirement.
PMTLM-17	SIMSS/PM-1 shall be capable of setting values into fields of telemetry packet headers.	N	
PMTLM-18	SIMSS/PM-1 shall provide the capability to transmit up to two streams of telemetry.	F	
PMTLM-19	SIMSS/PM-1 shall execute telemetry directives that start and stop the transmission of data.	F	
PMTLM-20	SIMSS/PM-1 shall generate EDUs and EDOS data headers based on the User Datagram Protocol (UDP) format definitions.	F	
PMTLM-21	SIMSS/PM-1 shall be capable of simulating memory dumps. SIMSS/PM-1 shall build packets based on the contents of simulated memory.	N	
PMTLM-22	SIMSS/PM-1 shall provide the capability to simulate EOS PM-1 low-rate spacecraft return-link data.	P	PDB must be supplied for full implementation of this requirement.
PMTLM-23	SIMSS/PM-1 shall allow modification of any field within the EDOS data header.	N	
PMTLM-24	SIMSS/PM-1 shall provide the capability of transmitting the CLCW in the form of EDUs.	F	The PM-1 Enhanced CLCW format was received too late to be implemented in this release. The previously defined format was used.
PMTLM-25	SIMSS/PM-1 shall transmit EDUs on an as built basis.	F	
PMTLM-26	SIMSS/PM-1 shall provide the capability to transmit EDUs using the UDP protocol.	F	
PMTLM-27	SIMSS/PM-1 shall provide the capability to enable and disable the transmission of CLCW EDUs.	F	
PMTLM-28	SIMSS/PM-1 shall provide for the storage of EDUs.	N	
PMTLM-29	SIMSS/PM-1 interface with the EOC shall comply with the telemetry interface formats and protocols specified in the EDOS to EGS Elements interface documents.	F	
PMTLM-30	SIMSS/PM-1 shall provide the capability to accept PM-1 telemetry data by electronic transmission and by physical media.	N	

Attachment G – Requirements Matrix
(Compliance changes from Release 1.0 are in bold)

PMTLM-31	SIMSS/PM-1 shall be capable of transmitting the contents of a user provided file containing PM-1 telemetry data.	N	
PMTLM-32	SIMSS/PM-1 shall be capable of maintaining an internally generated time code.	P	Presently system time is used to maintain time code. An internal timing card will be used in a future release.
PMTLM-33	SIMSS/PM-1 shall set, adjust, and operate the spacecraft clock as commanded.	N	
PMTLM-34	SIMSS/PM-1 shall employ an offline utility to convert the ASCII-formatted PDB into a binary format useable by SIMMS/PM-1.	N	
PMTLM-35	SIMSS/PM-1 shall use the PDB to determine the APID number and length of valid PM-1 telemetry packets.	N	
PMTLM-36	SIMSS/PM-1 shall use the PDB to determine the number and mnemonics of telemetry parameters.	N	
PMTLM-37	SIMSS/PM-1 shall use the PDB to define raw-to-EU conversions for telemetry parameters. SIMSS/PM-1 shall support both linear and polynomial conversions.	N	
PMTLM-38	SIMSS/PM-1 shall use the PDB to determine valid SIMSS/PM-1 command formats.	N	
PMTLM-39	SIMSS/PM-1 shall use the PDB to determine telemetry end-item verifiers for commands.	N	
PMTLM-40	SIMSS/PM-1 shall execute modeling directives that enable or disable selected orbit modeling.	N	Modeling requirement TBD
PMTLM-41	SIMSS/PM-1 shall execute modeling directives that associate any telemetry parameter with a predefined model.	N	Modeling requirement TBD
PMTLM-42	SIMSS/PM-1 shall execute modeling directives that change between static, table or algorithm models.	N	Modeling requirement TBD
PMTLM-43	The SIMSS/PM-1 GUI shall acknowledge each operator request within 2 seconds of entry.	F	
PMTLM-44	The SIMSS/PM-1 GUI shall start execution of each operator request within 5 seconds of entry.	F	
PMTLM-45	SIMSS/PM-1 shall provide the operator with an offline capability to access model functions and coefficients.	N	Modeling requirement TBD
PMTLM-46	SIMSS/PM-1 shall provide the operator with an offline capability to translate ASCII-formatted files containing static, table and algorithm orbit modeling information into a binary form readable by SIMSS/PM-1.	N	Modeling requirement TBD
PMTLM-47	SIMSS/PM-1 shall be capable of maintaining an internal time code to a resolution of 200 milliseconds.	N	
PMTLM-48	SIMSS/PM-1 shall provide the capability to store up to 8MB of transmitted EDUs.	F	
PMTLM-49	SIMSS/PM-1 shall receive CLTUs in command data blocks and output EDUs (packets and CLCWs).	F	

Attachment G – Requirements Matrix
(Compliance changes from Release 1.0 are in bold)

PMTLM-50	SIMSS/PM-1 shall generate telemetry based on four Spacecraft Controllers. The telemetry contents shall be based on packet lists and format tables provided by the PM-1 project.	N	
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Attachment H – System Limitations

H.1 SIMSS/PM1 Release 2.0 Limitations

The following limitations apply to SIMSS/PM1 Release 2.0.

Problem Description	Possible Workaround
When logging telemetry, using default log file names will corrupt log data. This occurs because both telemetry streams will be written to the same log, since each log file default name is identical.	When logging more than one telemetry stream, rename the log files to make them unique.
When left running, the system will eventually terminate abnormally.(DR SMOdr 05391)	Reset the computer and bring the simulator back up.
Log modules do not allow a user to stop and restart logging to the same file. Each start/restart requires a new log file name or the previously logged data will be overwritten.	Users should be aware of this limitation. In order to save previously logged data, always specify a new log file before starting or restarting a log module.
The validation of the CLTU start and tail sequences can not be disabled. A change in the design requires the simulator to parse the input buffer for CLTUs. The start and tail sequences are the delimiters.	This should not be problem unless the commands sent by the user do not have a CLTU start sequence of EB90 ₁₆ and a tail sequence of C5C5 C5C5 C5C5 C579 ₁₆ (as specified in the ICD).

H.2 Assumptions

The following assumptions have been made based upon current information available for the PM-1 spacecraft:

1. The input buffer for commanding for Release 2.0 is defined to be 900 bytes long.
The Command Data Block (CDB) messages may contain multiple CLTU messages.
2. Additionally, each AD Transfer Frame is assumed to contain one complete Packet.

Attachment I - Release History Summary Matrix

Attached is the release history summary matrix, which reflects the SIMSS/PM1 Release 2 delivery.

Release History Summary Matrix									
SYSTEM:	SIMSS/PM1								
RELEASE NUMBER		1.0	2.0						
DELIVERY DATE		7/30/99	9/24/99						
CONFIGURATION ITEM	CI NO.								
Core (client)	1.1	1.0	2.0						
Core (server)	1.2	1.0	2.0						
SC-PM1 (client)	1.3	1.0	2.0						
SC-PM1 (server)	1.4	1.0	2.0						
GS (client)	1.5	1.0	2.0						
GS (server)	1.6	1.0	2.0						
IP input (client)	1.7	1.0	2.0						
IP input (server)	1.8	1.0	2.0						
IP output (client)	1.9	1.0	2.0						
IP output (server)	2.0	1.0	2.0						

DQM (client)	2.1	*	*						
DQM (server)	2.2	*	*						
Logging (client)	2.3	1.0	2.0						
Logging (server)	2.4	1.0	2.0						

_ * To be delivered in a future release

Attachment J - Delivery Details

J.1 Hardware for MPS/PM-1 unit in GSFC, Building 32 Room S9

Qty	Common Name	Model [Serial No.]	Mfg	CSOC No.	Description
1	Computer	E-4200 001-343-8943	Gateway	C0060047	Intel Pentium II 400 Mhz w /512 Cache, 128 MB SDRAM PC100 6ns Micron, Matrox Millenium II 8MB AGP Video card, Toshiba 32x SCSI CD ROM Drive, Seagate 9.1 GB hard disk, IOMEGA 100 mb internal zip drive
1	Monitor	VX1100 811053233	Gateway	C0060041	21" Monitor
1	Mouse	Intellimouse 2570734-10000	Gateway		
1	Keyboard	Q9045A1837	Gateway		
1	Timing Card	PCIDCC20-P	Industrial Computer Source		PCI counter/timer card

J.2 Software

A complete listing of the SIMSS/PM-1 software file names will be available upon request.

Attachment K - Documentation References

The following documents have been employed as the main sources for direction and information in producing Release 2.0 of the SIMSS/PM-1 simulator.

Document	Location
TRW, Earth Observing System (EOS) Common Spacecraft Program Interface Control Document Between the EOS PM-1 Spacecraft and the EOS Ground System, No.: D22262, latest version dated June 12, 1999 (more commonly known as "The Space to Ground ICD")	1
National Aeronautics and Space Administration, Goddard Space Flight Center (GSFC), ICD Between the EOS PM-1 Spacecraft and the EOS Ground System Appendix Z: Additional Control Center Interface Information Revision 4 (draft), dated June 17, 1999	1
TRW, EOS PM-1 Spacecraft Flight Software Requirements Specification, ES-SDA-001	1
TRW, Earth Observing System Common Spacecraft Program Flight Software User's Guide, No.: D26696, latest version dated July 31, 1998	1
TRW, EOS Common Spacecraft Command Allocation Document, No.: D25099, (preliminary)	1
TRW, Earth Observing System (EOS) EOS PM-1 Telemetry Allocation Document, No.: D25100, (preliminary)	1
TRW, EOS PM-1 Spacecraft Equipment Specification for Transponder Interface Electronics, No.: EQ4-4957, latest version dated 11 February, 1999	1
TRW, Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and the EOS Ground System (EGS) Elements CDRL B301	2
Consultative Committee for Space Data Systems, CCSDS 102.0-B-4: Packet Telemetry Blue Book, Issue 4, Nov. 1995	3
--, CCSDS 202.1-B-1: Telecommand Part 2.1 – Command Operations Procedures Blue Book, Issue 1, Oct. 1995	3
NASA, GSFC, Earth Observing System Data and Information System (EOSDIS) Test System (ETS) Functional and Performance Requirements for the PM-1 Spacecraft, Sep. 1998	-

Location Legend:

Number	Designation
1	http://www.omitron.com/eospm/eosfos/mittrw.HTM
2	http://esdis-it.gsfc.nasa.gov:8080/servlet/DOCcat?nCatType=ICD
3	http://ccsds.org/publications.html

Attachment L — Mission Systems Configuration Management Form

This attachment contains the completed Mission Systems Configuration Management (MSCM) form for the delivery of SIMSS/PM1 Release 2.0.

Mission Systems Configuration Management Form

<u>1. ORIGINATOR</u> Estelle Noone	<u>2. ORGANIZATION</u> CSC	<u>3. PHONE</u> 301-805-3653	<u>4. E-MAIL ADDRESS</u> enoone@csc.com
<u>5. ELEMENT</u> ETS (SIMSS/PM1)		<u>6. INSTALLATION PRIORITY</u> Routine	<u>7. TRACKING NUMBER</u> (Assigned by CM Office)
<u>8. SOURCE CHANGE REQUEST(S):</u> ETS delivery of MPS for EOS PM-1 (SIMSS/PM1)		<u>9. APPROVALS</u> <div style="display: flex; justify-content: space-between;"> <div>Element Manager</div> <div>_____</div> <div>____/____/____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Flight Ops Director</div> <div>_____</div> <div>____/____/____</div> </div> <div style="display: flex; justify-content: space-between;"> <div>Operations Manager</div> <div>_____</div> <div>____/____/____</div> </div>	
<u>10. DELIVERED SYSTEM</u> (Check all that apply)			
	Name	Version	Media Identification
<input type="checkbox"/> Hardware	_____	_____	_____
<input checked="" type="checkbox"/> Software	SIMSS/PM1_	R2.0	CD-ROM _____
<input type="checkbox"/> Database	_____	_____	_____
<input checked="" type="checkbox"/> Documentation:			
	MPS/PM1 delivery package	N/A	3.5" Diskette
	_____	_____	_____
	_____	_____	_____
<input type="checkbox"/> Other	_____	_____	_____
<u>11. CHANGE DESCRIPTION</u> Release 2 of MPS/PM-1 (SIMSS/PM-1) _____ _____ _____			
<u>12. ATTACHMENT(S):</u> Check if YES <input checked="" type="checkbox"/> Description: SIMSS/PM1 release 2.0 delivery package(cover letter with attachments) dated 9/24/99 _____ _____			
<u>13. CM OFFICE USE</u>			
	Location (Bldg/Room)	Slot location(s)	
Hardware	____/____	_____	
Media	____/____	_____	
Documentation	____/____	_____	
Installation date	____/____/____	CM Office Signature _____	

Form MSCM (970327)